

# Selected Readings in **COMPUTING AND TELECOMMUNICATIONS**

Editors  
Mira Kartiwi  
Teddy Surya Gunawan  
Aisha Hassan Abdalla Hashim



IIUM Press  
INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

# **SELECTED READINGS IN COMPUTING AND TELECOMMUNICATIONS**

---

## **Editors**

Mira Kartiwi

Teddy Surya Gunawan

Aisha Hassan Abdalla Hashim



**IIUM Press**

Published by:  
IIUM Press  
International Islamic University Malaysia

First Edition, 2011  
©IIUM Press, IIUM

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without any prior written permission of the publisher.

Perpustakaan Negara Malaysia

Cataloguing-in-Publication Data

Mira Kartiwi, Teddy Surya Gunawan, Aisha Hassan Abdalla Hashim:  
Selected Readings in Computing and Telecommunications

**ISBN: 978-967-0225-81-4**

Member of Majlis Penerbitan Ilmiah Malaysia – MAPIM  
(Malaysian Scholarly Publishing Council)

Printed by:  
**IIUM PRINTING SDN. BHD.**  
No. 1, Jalan Industri Batu Caves 1/3  
Taman Perindustrian Batu Caves  
Batu Caves Centre Point  
68100 Batu Caves  
Selangor Darul Ehsan

## TABLE OF CONTENT

---

<b>PREFACE .....</b>	<b>X</b>
<b>1. MANUSCRIPT PROCESSES MONITORING SYSTEM FOR RESEARCH MANAGEMENT CENTER</b>	
Aznan Zuhid bin Saidin, Mira Kartiwi and Husam bin Latih @ Abdullatif ..	1
<b>2. IIUM STUDENTS FORUM SYSTEM</b>	
Mira Kartiwi and Waleed Mohamed Ibrahim .....	9
<b>3. SABA DECORATION FACTORY (SDF) SYSTEM</b>	
Mira Kartiwi and Abdulaziz Omar .....	17
<b>4. TAKAFUL AGENCY WEB PORTAL</b>	
Mira Kartiwi and Mohd. Hafiz Zairin bin Ayop .....	27
<b>5. HUMAN CAPITAL BUSINESS PARTNER INFORMATION TECHNOLOGY &amp; NETWORK TECHNOLOGY MAN POWER MODEL</b>	
Akram M. Z. Khedher and Siti Sarah binti Abdul Halim .....	39
<b>6. DEVELOPMENT OF ENERGY ASSESSMENT TOOLS FOR SINGLE PHASE APPLIANCES</b>	
Musse Mohamud Ahmed and Siti Nor Amiza bt Massere .....	52
<b>7. FINGERPRINT AUTHENTICATION SYSTEM USING MATLAB</b>	
Teddy Surya Gunawan and Mohd. Hanis bin Jenalis .....	66
<b>8. PERFORMANCE EVALUATION OF LOSSLESS SPEECH AND AUDIO COMPRESSION ALGORITHMS</b>	

<b>9. DESIGN AND IMPLEMENTATION OF VOICE SECURITY SYSTEM IN MATLAB AND JAVA</b>	
Teddy Surya Gunawan and Siti Ruqayah bt. Mohd Akahsah.....	<b>91</b>
<b>10. DESIGN AND DEVELOPMENT OF RFID SECURITY MODEL</b>	
Ahmed Wathik Naji and Fatema-Tuz-Zohra.....	<b>112</b>
<b>11. RADIO PROPAGATION MEASUREMENT AND CHANNEL MODELLING FOR WIRELESS BODY AREA NETWORK</b>	
Mimi Aminah bt. Wan Nordin and Norsyaidatul Fairuz bt. Fauziz .....	<b>125</b>
<b>12. FEATURE EXTRACTION FOR AUTOMATIC FETUS AGE ESTIMATION FOR ULTRASOUND IMAGES USING ELLIPSE MODEL</b>	
Teddy Surya Gunawan and Norakmal Abdullah.....	<b>143</b>
<b>13. NOISE REDUCTION USING KALMAN FILTER</b>	
Teddy Surya Gunawan and Ismail Haji Hassan Dualeh.....	<b>168</b>
<b>14. PARALLEL ALGORITHMS FOR EDGE DETECTION ON CLUSTER COMPUTER</b>	
Teddy Surya Gunawan and Elkabir Ansoya Bacar.....	<b>189</b>
<b>15. PREDICTION OF PROBABILITY OF BIT ERROR RATE IN DIGITAL COMMUNICATION SYSTEM</b>	
Saad Osman Bashir, Abdallah Mohammed Tawfeeq Zyoud and Besir Salah Eldin Mahmoud Sid Ahmed .....	<b>209</b>
<b>16. COMPARATIVE ANALYSIS OF LOW POWER VLSI CIRCUITS TECHNIQUES</b>	
Anis Nurashikin Nordin and Fatin Alea bt. Talib .....	<b>219</b>

<b>17. SPHERICAL POV LED DISPLAY USING PIC 16F628</b>	
Teddy Surya Gunawan and Muhammad bin Ahmad .....	<b>235</b>
<b>18. IMPLEMENTATION OF CAPACITANCE OF VOLTAGE CONVERTER FOR CAPACITIVE TRANSDUCERS</b>	
A.H.M. Zahirul Alam and Nur Fadhila bt. Che Halim .....	<b>255</b>
<b>19. PROTEIN CODING IDENTIFICATION OF HUMAN DNA SEQUENCE USING WAVELET</b>	
Teddy Surya Gunawan and Norashikin Abdul Wahab .....	<b>274</b>
<b>20. OPTIMIZATION OF ZAKAT MANAGEMENT SYSTEM IN INDONESIA USING GEOGRAPHIC INFORMATION SYSTEM (GIS)</b>	
Muharman Lubis .....	<b>292</b>
<b>21. IIUM CAR STICKER RECOGNITION USING PHASE BASED TEMPLATE MATCHING ALGORITHM</b>	
Teddy Surya Gunawan and Siti Aisyah bt. Mohamad .....	<b>308</b>

## **7. FINGERPRINT AUTHENTICATION SYSTEM USING MATLAB**

---

Teddy Surya Gunawan and Mohd. Hanis bin Jenalis

### **ABSTRACT**

This research work proposes an approach to authentication of off-line fingerprint image by matching it with fingerprint image stored in the database using MySQL. The proposal is based on a fingerprint image that will be enhanced through binarize and thinning to get the extracted minutiae. The extracted minutiae are then being stored in the database as a template for comparison or matching process. Fingerprint authentication is realized by Euclidean distance between the two corresponding features of the test fingerprint image and template fingerprint image in the database. Furthermore, it also focuses on the image processing part where the enrolled images are enhanced with image processing techniques and methods. It discusses the method on how to read fingerprint images, extract the feature from the fingerprint, get the required data and do matching from database images. The output of this system is to return either true or false as indication either authenticates or not. With the help of MATLAB we can use the code to do enhancement of image, process it into a digital image and then extract important features for the comparison process and with the help of MySQL we can learn to develop our very own fingerprint database.

### **7.1 INTRODUCTION**

Fingerprint authentication system is one of the biometric technologies that use fingerprint recognition, which is a type of physiological characteristics. There are a lot of researches done on the fingerprint issues in order to improve and make the system more secure and reliable. In this research